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PATENT APPLICATION

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Inventor(s): Jeff Zentner and Frederic Charlier

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Application No.: 09/895,703

Examiner: David G. Cervetti

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Group Art Unit: 2136

Title: KEY PAD DECODER

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TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 6-26-06.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month
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☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of \$0.00. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

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PATENT

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APPELLANT'S NEXT APPEAL BRIEF

This is Appellant's Next Appeal Brief filed in accordance with 37 CFR §41.37 appealing the Examiner's Office Action mailed April 3, 2006. Appellant's Supplemental Brief was filed January 23, 2006 in response to the Notice of Non-Compliance Appeal Brief mailed December 28, 2005. Appellant's original Appeal Brief was filed October 3, 2005 appealing the Examiner's Final Rejection mailed May 9, 2005. Appellant's original Notice of Appeal was filed September 9, 2005, and Appellant's new Notice of Appeal, pursuant to 37 CFR §41.31 is being filed concurrently herewith. This Brief is being submitted in triplicate. Appellant believes that no fees are due.

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I. Real Party in Interest

The real party in interest for this appeal is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. Related Appeals and Interferences

There are no related appeals or interferences.

III. Status of the Claims

Claims 1-6, 9-12 and 14-18 are pending in this application, claims 7, 8 and 13 having been cancelled by the Amendment filed February 24, 2005. Claims 1, 10 and 15 stand rejected under 35 USC §112, second paragraph. Claims 1 and 10 stand rejected under 35 USC §101. Claims 1, 10 and 15 stand rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,230,222 issued to Rush (hereinafter Rush) in view of U.S. Patent No. 5,264,848 issued to Kwon et al. (hereinafter Kwon). It is believed that the Examiner intended to reject claims 1, 3-6, 9-12 and 14 under §103(a) in view of Rush and Kwon. Claim 2 stands rejected under 35 USC §103(a) as being unpatentable over Rush, Kwon and U.S. Patent No. 5,832, 206 issued to De Jesus et al. (hereinafter De Jesus). Claim 3 has been objected to because of an informality. Claims 15-18 have been indicated as being allowable if rewritten or amended to overcome the §112, second paragraph, rejection.

IV. Status of Amendments

Appellant is filing an Amendment concurrently herewith to correct the informality in claim 3 identified by the Examiner. All other claim amendments have been entered.

V. Summary of the Invention

Appellant's invention is a system and related method for determining which key 16 of a key-pad device 10 is activated to determine a sequence of entered keys, such as for securely entering a personal identification number. The system uses an algorithm 30 that employs the same number of steps to make the determination regardless of which key 16 is pressed (claims 1 and 10, page 4, lines 6 – 8 and page 7, lines 8 - 10). The algorithm 30 assigns a key press value to each key 16 on the key-pad 14 (claims 7, 10 and 15, page 6, line 1). The system adds the key press values when the keys 16 are pressed (claims 1, 10 and 15, page 6, lines 15 and 16). The algorithm 30 first determines if more than one key 16 is pressed in more than one column (claims 1, 10 and 15, page 9, lines 18 and 19). If the algorithm 30 determines that only one key 16 has been pressed in one column, the algorithm 30 then determines which key 16 has been pressed by adding the key value for each key 16 pressed on a row-by-row basis (claim 6, page 6, lines 16 – 22). Once the algorithm 30 calculates the key press value, it then determines whether the added key value exceeds a predetermined value to determine if more than one key 16 has been pressed in the rows (claims 1, 10 and 15, page 7, lines 1 – 6 and page 8, lines 4 – 14). If the added value does exceed the predetermined value, then the algorithm 30 knows that more than one key 16 has been pressed and initiates a multiple key press sub-routine (page 5, lines 30-32 and page 6, lines 2-11). If the added value does not exceed the predetermined value, then the added value is subtracted from another predetermined value to give the key value to

identify the key 16 that is transmitted from the device 10 (page 7, lines 6 – 8 and page 7, line 14 – page 8, line 3).

VI. Grounds of Rejection to be Reviewed on Appeal

Whether claims 1, 10 and 15 should be rejected under 35 §112, second paragraph, as being indefinite for the reasons set forth on page 4 of the Office Action;

Whether claims 1 and 10 should be rejected under 35 USC §101 because the claimed invention is allegedly directed to non-statutory subject matter;

Whether claims 1, 3-6, 9-12 and 14 should be rejected under 35 USC §103(a) as being unpatentable over Rush in view of Kwon; and

Whether claim 2 should be rejected under 35 USC §103(a) as being unpatentable over Rush, Kwon and De Jesus.

VII. Argument

A. Independent claims 1, 10 and 15 are not indefinite under 35 USC §112, second paragraph

The Examiner has held that the language “the added key value” in independent claim 1, the language “the key value” in independent claim 10 and the language “adding the added key press values,” “to the added key value,” and “transferring the key value” in independent claim 15 do not have sufficient antecedent basis in the claim.

MPEP 2171 states that in order to be definite, “the claims must particularly point out and distinctly define the metes and bounds of the subject matter that will be protected by the patent grant.” This requirement is “an objective one because it is not dependent on the views of Applicant or any particular individual, but is evaluated in the context of whether the claim is definite – i.e., whether the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art.” MPEP

2173.05(e) states, “[o]bviously, however, the failure to provide explicit antecedent basis for terms does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite.” MPEP 2173.05(e) also states that, “[i]nherent components of elements recited have antecedent basis in that recitation of the components themselves. For example, the limitation “the outer surface of said sphere” would not require an antecedent recitation that the sphere has an outer surface.”

Independent claim 1 states that each key is assigned a predetermined key press value and that the controller adds the key press values when the keys are pressed and compares “the added key value” to a predetermined value. Appellant respectfully submits that the language “the added key value” in this context as defined in independent claim 1 would not render the claim indefinite because the added key value is an inherent component of the claim elements, and the scope of the claim would be reasonably ascertainable by those skilled in the art. Therefore, Appellant submits that independent claim 1 is definite.

Independent claim 10 states that each key is assigned a key press value and that the key-pad controller outputs the key value when one of the keys is pressed. Appellant respectfully submits that the scope of independent claim 10 would be reasonably ascertainable by those skilled in the art because a person of normal skill in the art would know that the key value is the key press value that is assigned to the key being pressed. Therefore, Appellant submits that independent claim 10 is also definite.

Independent claim 15 states that each key is assigned a key press value. Independent claim 15 also states that the key press values of all the keys that have been pressed are added on a row by row basis, where a first row added key value is determined as a first row added key value, and the added key press value of the second

row is added to the added key value. Independent claim 15 also states that it is determined whether the added key value exceeds a predetermined value, and if it does not, then the key value is transferred from the key-pad device. Appellant respectfully submits that the steps of independent claim 15 follow a natural progression supported by the specification, and that the scope of independent claim 15 would be reasonably ascertainable by those skilled in the art following the sequence of method steps as set forth in independent claim 15. Appellant therefore submits that independent claim 15 is also definite.

B. Claims 1 and 10 are directed to statutory subject matter under 35 USC §101

MPEP 2106(A) states that a claimed invention as a whole must accomplish a practical application to satisfy §101. That is, it must produce a useful, concrete and tangible result. This is because patent protection is limited to inventions that possess a certain level of real world value as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research.

The Examiner's sole discussion concerning claims 1 and 10 being directed to non-statutory subject matter under §101 is that "[e]ven though the claims are directed to a structure, the result of the comparison is not a tangible result . . ."

Appellant respectfully submits that this is an entirely improper use of §101. Appellant submits that the result of the comparison referred to by the Examiner is tangible because in many key-pad device controls, simultaneously pressing two keys is an invalid response. Therefore, it is necessary to know that multiple keys have been pressed so that an invalid command can be given. Appellant submits that independent claims 1 and 10 fall well within the bounds of statutory subject matter.

C. Independent claims 1 and 10 are not obvious in view of Rush and Kwon

1. *Prima Facie* Obviousness

MPEP 2143 states that in order to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. And, the prior art reference must teach or suggest all the claim limitations. Appellant respectfully submits that the Examiner has not met any of these three criteria by the combination of Rush and Kwon.

2. Independent claims 1 and 10

Independent claims 1 and 10 claim a key pad device including a plurality of keys and a key pad controller. The key pad controller assigns each key a predetermined key press value and adds the key press values when the keys are pressed. The controller determines which key has been pressed by a process that uses the same number of steps regardless of which key is pressed. The controller compares the added key value to a predetermined value to determine if multiple keys have been simultaneously pressed.

3. Rush

Rush discloses a keyboard 10 having a left hand key set 14 and a right hand key set 16. The key sets 14 and 16 include four prioritized arrays 20 including a plurality of closely spaced keys 24. Each key 24 is prioritized by a certain code in an ascending order from bottom to top, as shown in figure 2 and described in the relevant text. An encoder 26 receives input signals from the keys 24 when they are pressed.

The encoder 26 selects the key signal that has the highest priority as the key that the operator intended to push. Therefore, the operator can push multiple keys simultaneously, where the key with the highest priority is the one that is used. As mentioned in the Abstract, "the keys (24) are closely-packed together and are prioritized so that the user need not avoid simultaneously depressing multiple keys; rather, selection of the particular key requires only that the user avoid depressing a key that is higher priority than the desired key."

4. Kwon

Kwon discloses a key scan circuit for a key pad 20 that determines which key in the key pad 20 has been pressed by a process shown in figure 3. The Kwon key scan circuit includes a first memory MA that is initialized with the bits 1111 and a second memory MB that is initialized with the bits 0000, where the memory MA is used to determine if a key is pressed in one of the rows of the key pad 20 and the memory MB is used to determine if a key is pressed in one of the columns of the key pad 20, as shown in figure 2 of Kwon. If no keys are pressed, then the memory MA and MB remain 1111 and 0000, respectively. If a key is pressed on the key pad 20, then the corresponding bit in the memory MA will be changed to a 0 depending on what row the key is in, and the corresponding bit in the memory MB will be changed to a 1 depending on what column the key is in. In other words, one of the bits in the memory MA is changed if any key is pressed in the row that that bit represents, and one of the bits in the memory MB is changed if any key is pressed in the column that that bit represents.

The Kwon key scan circuit determines if multiple keys are simultaneously pressed (double-key) in step S609 of figure 3. Particularly, if multiple keys are pressed, the key scan circuit will put more than one 0 bit in the memory MA and/or more than one 1 bit in the memory MB. Column 4, line 16 – 21 of Kwon states, "if more than one

logical "0's" appear in first memory MA, or if more than one logical "1's" are present in second memory MB, step S609 judges that multiple keys are being pushed, then the operation advances to step S610 and performs an error process, and then completes the operation." If a double-key is not pressed, the Kwon scan circuit calculates a key value to identify the key at step S611 using the formula $4m+n=MB$ (column 4, lines 22-29).

5. Discussion

The Examiner states on page 5 of the Office Action that the Rush process has the same number of steps regardless of which key is activated, citing column 4, lines 9-50. That section of Rush is recreated below.

Referring now to FIG. 2, there is shown one technique for prioritizing among a plurality of simultaneous keypresses within a single one of the arrays 20. Each of the keys 24 is electrically connected to an input of a 74147 priority encoder 26. As is known, priority encoder 26 produces a BCD output corresponding to the decimal number associated with the activated input and, in the case of two or more inputs being simultaneously activated, prioritizes among the nine data inputs in ascending numerical order. Thus, as indicated in FIG. 2, to select the digit "5" all the user need do is depress the desired key (labelled "5") and refrain from depressing any key representing a numerically larger digit. The depicted simultaneous selection of keys representing numerals 2, 3, and 4 (which is virtually inevitable given the small size and close spacing of keys 24) will be ignored by priority encoder 26 such that the key corresponding to "5" is solely recognized as the valid keypress. Priority encoder 26 therefore generates a BCD output ("0101") that is provided to an interface circuit 28 which transmits the encoded character to a computer 30 via serial cable 18. Although the construction and operation of a suitable interface circuit 28 is well within the knowledge of one skilled in the art, an illustrative implementation of interface circuit 28 will be described further below in connection with FIG. 5.

Thus, it will be appreciated that this combination of an array 20 of the keys 24 can be used along with priority encoder 26 to input a single digit. As shown in FIG. 3, this arrangement is used in conjunction with each of the arrays 20 to permit simultaneous input of more than one digit. In particular, within keyboard 10 each array 20 is connected to a corresponding

priority encoder 26, the outputs of which are connected to the single interface circuit 28 which handles serial transmission of the digits to computer 30. By chording of the arrays 20, multiple digits can be simultaneously input to interface circuit 28, which then immediately transmits them to computer 30. This chording of the prioritized arrays is depicted in FIG. 4 which shows a user's left hand inputting the upper four digits (5-1-9-8) of an eight digit number. This arrangement is particularly useful for inputting numbers since, once the chording of the arrays is mastered by the user, large numbers can be entered in a single operation.

Appellant can find no discussion in this section of Rush that the same number of steps are used to determine which key is activated. Appellant submits that Rush does not use the same number of steps to determine which key is activated because the number of steps would be determined based on how many keys the user does press. Particularly, because the process selects the highest priority of multiple keys that are pressed as the desired key, the number of steps would depend on how many comparisons need to be made between the keys that are pressed to make the determination of which one has the highest priority.

The Examiner goes on to state that Kwon teaches adding key press values when keys are pressed and comparing the added key value to a predetermined value to determine if multiple keys have been simultaneously pressed.

Appellant respectfully submits that Kwon does not teach assigning a predetermined key press value to each key. The keys are identified by the overlap of the logical 0s and 1s in the memories MA and MB, and therefore each key is not assigned its own predetermined key press value. A key is defined using the formula $4m+n=MB$. Therefore, Kwon also does not teach adding the predetermined key press value when the keys are pressed to identify the key.

In Appellant's claimed invention, once the key press values are added, the added key value is compared to a predetermined value to determine if multiple keys

have been simultaneously pressed. The Examiner states that Kwon teaches that the key scan circuit compares an added key press value to a predetermined value to determine if multiple keys have been simultaneously pressed, citing column 4, lines 9-66. However, the Examiner does not provide any discussion as to how the Kwon scan circuits does this. Appellant respectfully submits that Kwon does not provide this teaching.

Appellant respectfully submits that the only teaching in Kwon of determining whether multiple keys have been pressed is found in column 4, lines 14-21 and column 4, lines 62-65 discussing step S609. This section of Kwon states that the key scan circuit determines that multiple keys have been pressed if more than one bit in the memory MA is 0 or more than bit in the memory MB is 1. Nowhere in those sections, or any other section of Kwon, does it teach or suggest that the key scan circuit determines if multiple keys have been simultaneously pressed by comparing an added key press value to a predetermined value.

Appellant respectfully submits that Rush is not concerned with determining if multiple keys have simultaneously been pressed, and Kwon teaches determining whether multiple keys have been pressed by an entirely different process than that claimed by Appellant, as discussed above. Therefore, Appellant respectfully submits that the Examiner has not established a *prima facie* case of obviousness because there is no suggestion or motivation of combining the teachings of Rush and Kwon concerning determining whether multiple keys have been pressed because Rush does not determine if multiple keys have been pressed. Also, there is not a reasonable expectation of success when combining the teachings of Rush and Kwon because they are directed to entirely different processes of determining which key has been pressed in a keypad. Also, Rush and Kwon do not teach or suggest all of the claim limitations

because, as discussed above, neither Rush or Kwon teaches the claimed steps of determining if multiple keys have been pressed by adding key press values when the keys are pressed and comparing the added key value to a predetermined value to determine if multiple keys have been simultaneously pressed. Therefore, Appellant respectfully submits that independent claims 1 and 10 are not made obvious by the combination of Rush and Kwon.

D. Dependent claims 3-6, 9, 11, 12 and 14 are not obvious in view of the combination of Rush and Kwon

The Examiner states that the limitation in dependent claims 5 and 11 of adding a counter value to a counter if a key is activated in a column can be found in column 3, lines 60-68 of Kwon. That section of Kwon is recreated below.

Meanwhile, if step S604 shows PA to be other than "1111", the decision process determines that at least one key has been pressed in step S602, and advances to step S605 where the microprocessor 10 carries out two logic functions: first, the current value of first memory MA is multiplied by the logic value of first port PA, then restored into MA, and secondly, the current value of second memory MB is summed with the logic value of data direction register DDR, then restored into MB.

Appellant can find no discussion in this section of Kwon of adding a counter value to a counter if a key is activated in a column, and therefore, Kwon cannot anticipate dependent claims 5 and 11.

The Examiner also states that the limitation in dependent claims 5 and 11 of determining which column is being monitored for a key activation by a set bit in a digital word can be found in column 3, lines 49 – 55 and column 4, lines 22 – 42. Those sections of Kwon are recreated below.

If any keys in that column have been pressed, they are found in step S604, where the first port PA is checked against the value "111" which corresponds to the pull-up resistors 30. If PA

matches "1111", it is determined that none of the input port bits are pulled low, and no pressed key exists in that column.

In the meantime, if there is only one "0" in MA and one "1" in MB in step S609, step S611 defines the key's value with the formula: $4m+n=MV$ which allows S612 to key in and terminate the procedure. Here, MV denotes the key's value, m corresponds to a value of m when the mth bit of first memory MA is a logic "0", and n corresponds to a value of n when the nth bit second memory MB is a logic "1".

For example, if the 9th key of the keypad's matrix is pushed in step S602, "1011" is fed to the first port PA. In doing so, the value "1111", initialized MA set in step S601, is logically multiplied by the value "1011", i.e., the currently held input value of PA, and the product "1011" is stored in the first memory MA. Second memory MB calculation is executed by logically summing the value "0000", initialized MB set in step S601, with the value "0010", i.e., the current state of DDR, and the result "0010" is stored in the second memory MB. Thus, as m becomes two via bit b2 and n becomes one via bit b1, MV is figured to be nine, or the 9th key in the matrix.

Appellant has carefully reviewed these sections of Kwon and can find no teaching therein of determining which column is being monitored for a key activation by a set bit in the digital word. Therefore, Appellant submits that Kwon cannot anticipate this limitation of Appellant's invention either.

The Examiner states that the limitation of dependent claims 9 and 14 concerning subtracting the added key value from a predetermined value to calculate a key value to be transmitted can be found in column 1, lines 59 – 62, column 3, lines 1 – 22 and column 4, lines 1-29. Those sections of Kwon are recreated below.

"a second memory for storing the logic value of n column signals input to the second port logically summed with the logic values of the data direction register; and"

"A microcomputer 10 comprises a first port PA having 4 bits b0, b1, b2 and b3 for receiving a 4-bit row signal via row scan lines 50 when any key is pressed on keypad 20; a first memory MA for storing the logic value of the 4-bit row signal input to the first port PA logically multiplied by the previously stored logic value therein; a second port PB having 4 bits b0, b1, b2 and b3 for outputting, the 4-bit column signal from the keypad 20 via column scan lines

40; a data direction register DDR for setting each bit of the second port PB to the input or output mode; a second memory MB for storing the logic value of the 4-bit column signal input to the second port PB logically summed with the logic value of each bit of a data direction register DDR. Pull-up resistor portion 30 for supplying a reference logic value to keypad 20 is coupled to the keypad 20 and an AND gate 60. The AND gate 60 provides a logical product of the signals output from keypad 20, to be used as a control signal for performing an automatic on/off function of the microcomputer system or for supplying a key check signal."

"After step S605, the carry bit is cleared and a rotate shift left function is done by the data direction register DDR in step S606.

Step S607 checks if carry bit value C equals one. This occurs when the data direction register DDR, set to "0001" in step S603, has completed four rotate shift left functions and all columns have been scanned. Steps S604, S605, and S606 are repeated until C=1.

After key-scanning, steps S608 and S609 decide how many, if any, keys are pressed. If C=1 in step S607, it is determined whether the second memory MB is still set to "0000" in step S608. If MB=0000 in step S608, the operation is complete with no pressed keys being detected. However, if MB.noteq.0000 in step S608, the operation moves to step S609 to determine if there has been a double-key error. If more than one logic "0's" appear in first memory MA, or if more than one logic "1's" are present in second memory MB, step S609 judges that multiple keys are being pushed, and then the operation advances to step S610 and performs an error process, and then completes the operation. "

In the meantime, if there is only one "0" in MA and one "1" in MB in step S609, step S611 defines the key's value with the formula: $4m+n=MV$ which allows S612 to key in and terminate the procedure. Here, MV denotes the key's value, m corresponds to a value of m when the mth bit of first memory MA is a logic "0", and n corresponds to a value of n when the nth bit second memory MB is a logic "1".

Appellant has carefully reviewed these sections of Kwon and can find no teaching therein of subtracting the added key value from a predetermined value to calculate key value to be transmitted. Therefore, Appellant submits that Kwon cannot anticipate dependent claims 5 and 11 for this reason also.

E. Dependent claim 2 is not obvious in view of the combination of Kwon et al. and De Jesus et al.

Dependent claim 2 states that the key-pad device includes a display and a magnetic strip reader. Appellant acknowledges that these components of a key-pad device are known in the art. De Jesus discloses a transactional terminal that includes a display and a magnetic strip reader. However, Appellant submits that the Examiner has not stated that De Jesus includes the limitations of Appellant's claimed invention discussed above that could make Appellant's claimed invention obvious.

VIII. Conclusion

Appellant respectfully submits that independent claims 1, 10 and 15 are not indefinite under 35 USC §112, second paragraph, and that claims 1 and 10 are directed to statutory subject matter under 35 USC §101. Appellant also respectfully submits that claims 1, 3-6, 9-12 and 14 are not obvious in view of the combination of Rush and Kwon and that dependent claim 2 is not made obvious by the combination of Rush, Kwon and De Jesus. It is therefore respectfully requested that the Examiner's Final Rejection under §112, second paragraph, §101 and §103(a) be reversed, and that Appellant's claims be allowed.

Respectfully submitted,

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CLAIMS APPENDIX

COPY OF CLAIMS INVOLVED IN THE APPEAL

1. A key-pad device comprising:
a key-pad including a plurality of keys; and
a key-pad controller providing a key value signal when one of the keys is activated, said controller determining which key is activated by a process including a predetermined number of steps, wherein the process has the same number of steps regardless of which key is activated, and wherein each key is assigned a predetermined key press value, said controller adding the key press values when the keys are pressed, and wherein the controller compares the added key value to a predetermined value to determine if multiple keys have been simultaneously pressed.
2. The device according to claim 1 further comprising a display and a magnetic strip reader.
3. The device according to claim 1 wherein the plurality of keys is arranged in a plurality of rows and a plurality of columns.
4. The device according to claim 3 wherein the controller determines if more than one key has been activated in more than one column.
5. The device according to claim 4 wherein the controller adds a counter value to a counter if a key is activated in a column, and wherein the controller determines which column is being monitored for a key activation by a set bit in a digital word.
6. The device according to claim 3 wherein the controller determines which key has been activated on a row-by-row basis.
7. Cancelled.
8. Cancelled.

9. The device according to claim 1 wherein the controller subtracts the added key value from a predetermined value to calculate a key value to be transmitted.

10. A key-pad device for transferring a key value representative of a key press to a terminal, said device comprising:

a key-pad including a plurality of keys arranged in a plurality of rows and a plurality of columns, each key being assigned a key press value; and

a key-pad controller outputting the key value to the terminal when one of the keys is pressed, said controller determining the key that is pressed by a process including a predetermined number of steps, where the number of steps is the same regardless of which key is pressed, said controller determining if more than one key has been pressed in more than one column, and then if only one key has been pressed, determining which key has been pressed on a row-by-row basis by adding the key press values for each key that is pressed, wherein the controller compares the added key press value to a predetermined value to determine if multiple keys in a column have been simultaneously pressed.

11. The device according to claim 10 wherein the controller adds a counter value to a counter if a key is pressed in a column, and wherein the controller determines that more than one key has been pressed in more than one column if the counter value in the counter is greater than a predetermined value.

12. The device according to claim 10 wherein the controller adds the key press value for each key pressed in a particular row before moving on to a next row.

13. Cancelled.

14. The device according to claim 10 wherein the controller subtracts the added key value from a predetermined value to determine the key value to be transmitted to the terminal.

15. A method for determining which key of a key-pad device having a plurality of keys arranged in a plurality of rows and a plurality of columns has been pressed, comprising:

assigning each key a key press value;
determining if a key has been pressed in one of the columns;
advancing a counter by a counter value if a key has been pressed;
determining if a key has been pressed in a next column and adding the counter value to the counter if a key has been pressed, otherwise keeping the counter value the same;
adding the key press value of all of the keys that have been pressed in a first row to generate a first row added key value;
adding the key press value of all of the keys that have been pressed in a second row and adding the added key press values of the second row to the added key value;
determining whether the added key value exceeds a predetermined value;
transferring the key value from the key-pad device if the added key value does not exceed the predetermined value; and
comparing the added key value to a predetermined key value to determine if multiple keys have been simultaneously pressed.

16. The method according to claim 15 wherein the key-pad includes four rows and four columns, and wherein advancing the counter for each pressed key in each column is performed for all four columns, and wherein adding the key press values for all of the keys is performed for all four of the rows.

17. The method according to claim 15 further comprising subtracting the added key value from a predetermined value to calculate the key value that is transmitted.

18. The method according to claim 15 wherein determining if a key has been pressed in one of the columns includes setting a set bit for a particular column if a key has been pressed in that column.

EVIDENCE APPENDIX

There is no evidence pursuant to §1.130, §1.131 or §1.132.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a court or the Board in any proceeding identified in Section II of this Appeal Brief.